FINAL TECHNICAL REPORT

Dynamics of Small-Scale Oceanic Motions
(ONR Contract #: N00014-90-J-1419)

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The overall research goals for this project were: Description and modeling of the kinematical structure and dynamical processes of oceanic motions that have horizontal scales from a few meters to a few kilometers. Understanding the role that these small-scale motions play in the redistribution and mixing of momentum, potential vorticity, heat, and salt.

The following specific tasks were completed:

- Definition and identification of small-scale potential vorticity carrying (vortical) motions.
- Normal mode decomposition of small-scale oceanic motions (Development of concept and application to oceanic data).
- Formulation and application of consistency tests for gravity and vortical motions.
- Sensitivity of model results to the parameterization of diapycnal mixing.

The results have been or will be published in:

1. Müller, P., 1995: Ertel's potential vorticity theorem in physical oceanography. *Rev. Geophys.* (accepted)

2. Schneider, N. and P. Müller, 1994: On the sensitivity of the surface equatorial ocean to the parameterization of vertical mixing. *J. Phys. Oceanogr.*, **24**, 1623-1640.

3. Müller, P., 1993: Diapycnal mixing in the ocean: a review. In: *Large Eddy Simulation of Complex Engineering and Geophysical Flows*. Cambridge University Press, 455-487.

4. Lien, R. C. and P. Müller, 1992: Normal mode decomposition of small-scale oceanic motions. *J. Phys. Oceanogr.*, **22**, 1583-1595.

5. Lien, R. C. and P. Müller, 1992: Consistency relations of gravity and vortical modes in the ocean. *Deep Sea Res.*, **39**, 1595-1612.

6. Lien, R. C. and P. Müller, 1991: Estimates of small-scale horizontal divergence and relative vorticity in the ocean. In: "Dynamics of Oceanic Internal Gravity Waves." Proceedings, 'Aha Huliko'a Hawaiian Winter Workshop, School of Ocean and Earth Science and Technology, Special Publication, 143-155.

Two Ph.D. dissertations have been completed within the project:

R. Lien	Coexistence of Gravity and Vortical Modes in Small-Scale Motions.	Ph.D. 1990
N. Schneider	Sensitivity of the Yoshida Jet to the Parameterization of Vertical Mixing.	Ph.D. 1992

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